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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/675,487	09/29/2000	Lester J. Kozlowski	24096.00300	1321
7590	06/22/2004		EXAMINER	
Doyle B. Johnson CROSBY, HEAFY, ROACH & MAY P.O. Box 7936 San Francisco, CA 94120-7936			AGGARWAL, YOGESH K	
			ART UNIT	PAPER NUMBER
			2615	
			DATE MAILED: 06/22/2004	

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Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)
	09/675,487	KOZLOWSKI ET AL.
	Examiner	Art Unit
	Yogesh K Aggarwal	2615

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) Responsive to communication(s) filed on 02/05/2002.
- 2a) This action is FINAL.                            2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) Claim(s) 1-15 is/are pending in the application.
  - 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-15 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 29 September 2000 is/are: a) accepted or b) objected to by the Examiner.
 

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) All b) Some \* c) None of:
    1. Certified copies of the priority documents have been received.
    2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 13) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
  - a) The translation of the foreign language provisional application has been received.
- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ .
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)
3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>4</u> .	6) <input type="checkbox"/> Other: _____ .

***Specification***

1. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: Claims 3, 4, 10, 12, 13 recite limitations describing an “input transistor”, which is not described in the specification.

***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 3, 4, 10, 12, 13 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The office notes that the input transistor having a source connected to the detector and a current source having a drain connected to the drain of the input transistor is not described in the specification in such a way as to enable one skilled in the art to make and/or use the invention.

- a) Claims 5-<sup>9</sup>8 are rejected as being depended on the rejected claims 3 and 4.
  - b) Claims 13-15 are rejected as being depended on the rejected claim 12.

***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

5. Claims 3 and 4 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

6. Claims 3 and 4 recite the limitation "the input transistor" in the last line of the claim. There is insufficient antecedent basis for this limitation in the claims.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fowler (US Patent # 6,424,375) in view of Ueno (US Patent # 6,342,920).

[Claim 1]

Fowler teaches the following:

A single photon read-out circuit (figure 1, col. 3 lines 33-37) comprising:  
a feed-back enhanced reset amplifier (figure 1: 106, col. 3 lines 55-58);  
a photodetector (figure 1: 112) connected to an output of the reset amplifier. Fowler fails to teach a high-gain amplifier connected to the photodetector. However Ueno teaches that it is well known and used in the art to have a high-gain amplifier (figure 1: 2, col. 3 lines 46-52) connected to the photodetector. Therefore taking the combined teachings of Fowler and Ueno it would have been obvious to one skilled in the art at the time of the invention to have been motivated to incorporate a high-gain amplifier connected to the photodetector. The benefit of doing so would

be to remove the DC components 116 produced by the background radiation, emphasizing the contrast, and a signal with high S/N ratio can be obtained as taught in Ueno (col. 4 lines 45-49).

[Claim 2]

Ueno teaches that it is well known and used in the art to have a high-gain amplifier (figure 5: 61) comprising an adaptive skimming circuit (figure 5: 62-65, col. 6 lines 12-19) having an integration capacitor (figure 2: 19)[Col. 5 lines 60-67 disclose that the capacitors C.sub.T1-C.sub.T4 are used as temporary storage devices. Col. 6 lines 1-4 disclose that skimming circuit 51, which is further disclosed in figure 5, generates the skimming voltage to perform the skimming operation].

[Claim 3]

Fowler teaches a source follower transistor (figure 1: 114, col. 3 lines 39-43) connected to the output of an input transistor (figure 1: 120, col. 4 lines 13-15).

[Claim 4]

Fowler teaches an access transistor (figure 1: 116) connected between the input transistor (figure 1: 120) and a bus (figure 1: 118, col. 3 lines 38-42).

9. Claims 5, 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fowler (US Patent # 6,424,375), Ueno (US Patent # 6,342,920) as applied to claims 1-4 above and further in view of Tanaka (US Patent # 6,037,577).

[Claim 5]

Fowler and Ueno fails to teach, “.... wherein the reset amplifier comprises a CMOS inverter. However Tanaka teaches that it is well known and used in the art to have a reset amplifier (figure 21) comprising a CMOS inverter (figure 21: 229 and 231, col. 17 lines 60-67, col. 18 lines 1-11).

Therefore taking the combined teachings of Fowler, Ueno and Tanaka it would have been obvious to one skilled in the art at the time of the invention to have been motivated to incorporate a reset amplifier comprising a CMOS inverter. The benefit of doing so would be to have a simple circuit, which is very effective when several fold gain is necessary (Tanaka, col. 18 lines 9-11).

[Claim 6]

The circuit of Claim 5, further comprising a reset transistor (Tanaka, figure 21: 260, col. 17 lines 60-67).

10. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fowler (US Patent # 6,424,375), Ueno (US Patent # 6,342,920), Tanaka (US Patent # 6,037,577) as applied to claims 5 and 6 above and further in view of Guidash (US Patent # 6,624,850).

[Claim 7]

Fowler, Ueno and Tanaka fail to teach “.... wherein reset amplifier further comprises a sample and hold transistor and sample and hold capacitor”. However Guidash teaches that it is well known and used in the art to have a reset amplifier (figure 3A: 32) comprising a sample and hold transistor and sample and hold capacitor (figure 3A: SHR and Cr). Therefore taking the combined teachings of Fowler, Ueno, Tanaka and Guidash it would have been obvious to one skilled in the art at the time of the invention to have been motivated to have a reset amplifier further comprising a sample and hold transistor and sample and hold capacitor. The benefit of doing so would be to cancel the pixel source follower offset voltage as taught in Guidash (col. 4 lines 16-20).

***Claim Rejections - 35 USC § 102***

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

12. Claim 11 is rejected under 35 U.S.C. 102(b) as being anticipated by Fossum et al. (US Patent # 5,665,959).

[Claim 11]

Fossum teaches an amplifier circuit for single photon read-out of photodetectors in an imaging array (figure 3), the circuit comprising:

Detector (figure 3: PD) means for converting incident light to an input electric signal (col. 6 lines 50-51);

amplifier means (figure 3: A1) connected to the detector means or suppressing kTC noise (col. 1 lines 51-59)[Read noise is being read as kTC noise) and

a high-gain amplifier means (figure 3: A2) connected to the detector means for reducing signal non-uniformity (col. 7 lines 35-48).

***Conclusion***

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

i. Levy (US Patent # 6,147,340).

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yogesh K Aggarwal whose telephone number is (703) 305-0346. The examiner can normally be reached on M-F 9:00AM-5:30PM.

15. If attempts to reach the examiner by telephone are unsuccessful, the examiner's Primary Examiner, Ngoc Yen Vu can be reached on (703) 305-4946. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

YKA  
June 9, 2004



NGOC-YEN VU  
PRIMARY EXAMINER